

REMARKS

The Office Action issued October 11, 2001 has been reviewed and the comments of the U.S. Patent and Trademark Office have been considered. Non-elected claims 10-13 and 21-30 have been canceled. Claims 1, 5, 14, 16, 31 and 38 have been amended. Claims 43-53 have been added. No new matter has been entered. Accordingly, Applicant requests reconsideration of the pending claims 1-9, 14-20 and 31-53.

Applicant thanks the Examiner for indicating that claims 5-6 and 16-18 would be allowable if rewritten into independent form. Claims 5 and 16 have been rewritten into independent form as suggested by the Examiner. Accordingly, claims 5 and 16 are in condition for allowance.

The specification has been amended to correct a typographical error on page 6, line 28. Support for this amendment to the specification is provided by the originally filed specification at, for example, page 6, lines 21-23.

Claims 1-3, 7, 9, 31-35 and 37 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent 6,095,118 to Klinger. Claims 4, 8, 14-15 and 19-20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Klinger in view of U.S. Patent 5,884,606 to Kellner. Claim 36 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Klinger in view of U.S. Patent 5,839,412 to Stockner. Claims 38, 39, 41 and 42 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Klinger in view U.S. Patent 5,878,718 to Rembold. Claim 41 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Klinger and Rembold as applied to claim 38, and further in view of Kellner.

Insofar as the rejections can be applied to amended claims 1, 14, 31 and 38, Applicant respectfully traverses these rejections because the relied upon references to Klinger, Kellner, Stockner or Rembold, singularly or in combination, fail to teach or suggest the claimed invention as a whole.

In particular, claim 1 recites a high pressure piston pump that includes, *inter alia*, at least two pistons, wherein the piston to which a bypass valve is connected has a surface area that is different than a surface area of the other piston of the at least two pistons. Claim 14 recites a high

pressure radial type piston pump that, in addition to other features, includes at least three pistons, wherein the piston to which a bypass valve is connected to has a surface area that is different than a surface area of the other pistons. Claim 31 recites a method of varying the flow output of a high pressure piston pump that is achieved in part by pumping fluid by a first piston and a second piston, each piston having a respective surface area that is different from each other. Claim 38 recites a high pressure fuel injection system that includes, among other features, at least two pistons, wherein the piston to which a bypass valve is connected to has a surface area that is different than a surface area of the other piston of the at least two pistons. Support for this amendment to the claims is provided in the originally filed specification at, for example, page 6, lines 5-8.

In contrast, Klinger states that each of a first pump element 16 and second pump element 17 has a piston 20. And, as recognized by the Examiner, the surface area of the piston 20 is identical for each of the pump elements 16 and 17 *instead*, as claimed, each piston having a surface area that is different from the respective surface area of the other piston(s). Accordingly, the rejection to claims 1 and 31 should be withdrawn because the claimed invention as a whole recites features not taught or suggested by Klinger.

Notwithstanding the deficiencies in Klinger, the Office Action asserts that it would have been obvious to modify Klinger in view of Kellner or Rembold in an attempt to reach the claimed invention as a whole. However, neither Klinger, Kellner, Rembold nor even Stockner teaches or suggests pistons with different respective surface areas, among other features, as discussed above. Thus, the proposed modification of Klinger in view of Kellner or Rembold fails to cure the deficiencies in Klinger, Kellner or Rembold, to achieve the claimed invention as a whole. Accordingly, the claims 14 and 38 are also patentable over Klinger, Kellner, Rembold or Stockner, singularly or in combination. Claims 2-4, 6-9, 13, 15, 17-20, 32-37, 39-44 and 49-53 depend ultimately from a respective one of claims 1, 5, 14, 16, 31 and 38, and are also allowable at least because claims 1, 5, 14, 16, 31 and 38 are allowable, as well as for reciting additional features.

Claim 45 has been added so as to more particularly and distinctly claim subject matter of the claimed invention as a whole. In particular, claim 45 has been added to recite the features of the preferred embodiments of Figs 3 and 4. Support for claim 45 is provided in the originally filed specification, at, for example, page 6, line 32 and originally filed claims 3 and 16. None of the relied upon references, singularly or in combination, teach or suggest a normally open bypass valve in a high pressure fuel injection system, as well as other features recited in claim 45. Accordingly, claim 45 is also in condition for allowance.

CONCLUSION

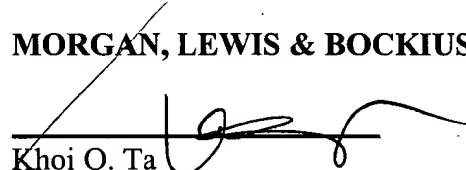
In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration and reexamination of this application and allowance of the pending claims 1-9, 14-20, 31-53. Applicant respectfully invites the Examiner to contact the undersigned at (202) 467- 7203 if there are any outstanding issues that can be resolved via a telephone conference.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached pages are captioned "**VERSION WITH MARKINGS TO SHOW CHANGES MADE.**"

EXCEPT for issue fees payable under 37 C.F.R. §1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. §§1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account No. 50-0310. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. §1.136(a)(3).

Respectfully submitted,

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IN THE SPECIFICATION:

The paragraph on page 6, starting on line 25, has been amended as follows:

--A bypass valve 82 is fluidly connected to at least one piston 78 to deactivate the piston 78. The bypass valve 82 includes a solenoid 84 for opening and closing the bypass valve 82. Figure 4 shows the bypass valve 82 closed. When the bypass valve 82 is opened, ~~fuel~~ **hydraulic oil** displaced by the piston 78 flows to the bypass valve through passage 92 and then to the low pressure side of the pump via passage 94. Therefore, when the bypass valve 82 is open, the piston 78 is deactivated. When deactivated or disabled, the piston 78 consumes no power except that needed to overcome mechanical friction and flow resistance over the bypass valve 82. Preferably, the bypass valve 82 is normally open such that the piston 78 is normally deactivated. The solenoid 84 is preferably activated by a signal from an engine electronic control unit 90.--

IN THE CLAIMS:

Non-elected claims 10-13 and 21-30 have been canceled without prejudice or disclaimer.

New claims 43-53 have been added.

Claims 1, 5, 14, 16, 31 and 38 have been amended as follows:

1. (Amended) A high pressure piston pump, comprising:
 - a housing having a low pressure fuel inlet and a high pressure fuel outlet;
 - at least two pistons disposed in the housing;
 - a driveshaft for supplying power to drive the at least two pistons; and
 - a bypass valve fluidly connected to at least one of the at least two pistons to deactivate

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the at least one piston, wherein the piston to which the bypass valve is connected to has a surface area that is different than a surface area of the other piston of the at least two pistons.

5. (Amended) ~~The~~A high pressure piston pump, comprising: of claim 4

a housing having a low pressure fuel inlet and a high pressure fuel outlet;

at least two pistons disposed in the housing;

a driveshaft that drives the at least two pistons; and

a bypass valve fluidly connected to at least one of the at least two pistons to deactivate

the at least one piston, wherein the piston to which the bypass valve is connected to has a surface area that is larger than a surface area of each of the other piston of the at least two pistons.

14. (Amended) A high pressure radial type piston pump, comprising:

a housing having a low pressure fuel inlet and a high pressure fuel outlet;

three pistons disposed in the housing;

a driveshaft for supplying power to drive the three pistons; and

a bypass valve fluidly connected to one of the three pistons to deactivate the one piston,

wherein the piston to which the bypass valve is connected to has a surface area that is different than a surface area of each of the other pistons.

16. (Amended) ~~The~~A high pressure radial type piston pump, comprising:

a housing having a low pressure fuel inlet and a high pressure fuel outlet;

three pistons disposed in the housing;

a driveshaft that drives the three pistons; and

of claim 15 a bypass valve fluidly connected to one of the three pistons to deactivate the one piston, wherein the bypass valve is normally open such that the one piston is normally deactivated.

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31. (Amended) A method of varying the flow output of a high pressure piston pump having at least two pistons comprising:

pumping fluid by a first piston of the at least two pistons, the first piston having a first surface area;

pumping fluid by a second piston of the at least two pistons, the second piston having a second surface area different from the first surface area; and

deactivating at least one of the at least two pistons.

38. (Amended) A high pressure fuel injection system, comprising:

a source of fuel;

a low pressure pump;

a high pressure piston pump, the low pressure pump being disposed between the fuel source and the high pressure piston pump;

a fuel rail including a plurality of fuel injectors, the high pressure piston pump being disposed between the low pressure pump and the fuel rail; and

a fuel return line connecting the fuel rail to a low pressure side of the high pressure pump;

wherein the high pressure piston pump comprises a housing having a low pressure fuel inlet connected to an output of the low pressure pump, a high pressure fuel outlet connected to an input of the fuel rail, at least two pistons disposed in the housing, and a bypass valve fluidly connected to at least one of the at least two pistons to deactivate the at least one piston and wherein the at least one piston to which the bypass valve is connected to has a surface area that is different than a surface area of the other piston of the at least two pistons.
